

## 2

**MATTER AND CHANGE****SECTION 2.1 PROPERTIES OF MATTER (pages 39–42)**

*This section helps you distinguish extensive from intensive properties and identify substances by their properties. It teaches you how to differentiate the three states of matter. It also defines a physical property and lists examples of physical properties and physical changes.*

**► Describing Matter (page 39)**

1. The \_\_\_\_\_ of an object is a measure of the amount of matter the object contains.
2. How does an extensive property differ from an intensive property?

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**► Identifying Substances (page 40)**

3. Matter that has a uniform and definite composition is called a \_\_\_\_\_.
4. Is the following sentence true or false? All samples of a substance have different physical properties. \_\_\_\_\_
5. A physical property is a quality or condition of a substance that can be \_\_\_\_\_ or \_\_\_\_\_ without changing the substance's composition.
6. Circle the letter of the term that is NOT a physical property.  
a. hardness      c. boiling point  
b. color      d. melting
7. Look at Table 2.1 on page 40. What is the melting point of bromine? \_\_\_\_\_
8. Look at Table 2.1 on page 40. Circle the letter of the substance that is a yellow solid and melts at 115°C.  
a. sulfur  
b. chlorine  
c. gold  
d. copper

**CHAPTER 2, Matter and Change** (*continued*)

9. Is the following sentence true or false? Physical properties can help a chemist identify a substance. \_\_\_\_\_

**► States of Matter (pages 41–42)**

10. Circle the letter of the term that is NOT a physical state of matter.
- a. water
  - b. gas
  - c. liquid
  - d. solid
11. Complete the table about properties of three states of matter. Use these terms: *definite, indefinite, easily, and not easily*.

Properties of the States of Matter			
Property	Solid	Liquid	Gas or Vapor
Shape		indefinite	
Volume	definite		indefinite
Can be compressed			easily

12. Match each arrangement of the particles in matter with a physical state.

**Physical State**

\_\_\_\_\_ gas

\_\_\_\_\_ liquid

\_\_\_\_\_ solid

**Arrangement****a.** packed tightly together**b.** close, but free to flow**c.** spaced relatively far apart

13. Is the following sentence true or false? The words *gas* and *vapor* can be used interchangeably. \_\_\_\_\_
14. The term gas is limited to those substances that exist in the gaseous state at \_\_\_\_\_.

15. What does *vapor* describe?

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### ► Physical Changes (page 42)

16. A physical change alters a given material without changing its chemical

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17. What are some words that describe physical changes?

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18. What is true about all physical changes that involve a change of state?

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## SECTION 2.2 MIXTURES (pages 44–47)

*This section explains how to classify a mixture as heterogeneous or homogeneous. It also describes ways to separate mixtures.*

### ► Classifying Mixtures (pages 44–45)

1. Is the following sentence true or false? Most samples of matter are mixtures.

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2. What is a mixture?

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3. Is the following sentence true or false? A heterogeneous mixture is one that has a completely uniform composition. \_\_\_\_\_

4. What is another name for a homogeneous mixture?

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5. Circle the letter of the term that describes a part of a sample with uniform composition and properties.

- a. solution
- b. mixture
- c. state
- d. phase

## CHAPTER 2, Matter and Change *(continued)*

6. How many phases exist in these types of mixtures?

a. Homogeneous \_\_\_\_\_

b. Heterogeneous \_\_\_\_\_

### ► Separating Mixtures (pages 46–47)

7. In general, what is used to separate mixtures?

\_\_\_\_\_

8. The process that separates a solid from a liquid in a heterogeneous mixture is called \_\_\_\_\_.

9. What happens during a distillation?

\_\_\_\_\_

Match each term with its location in the diagram.

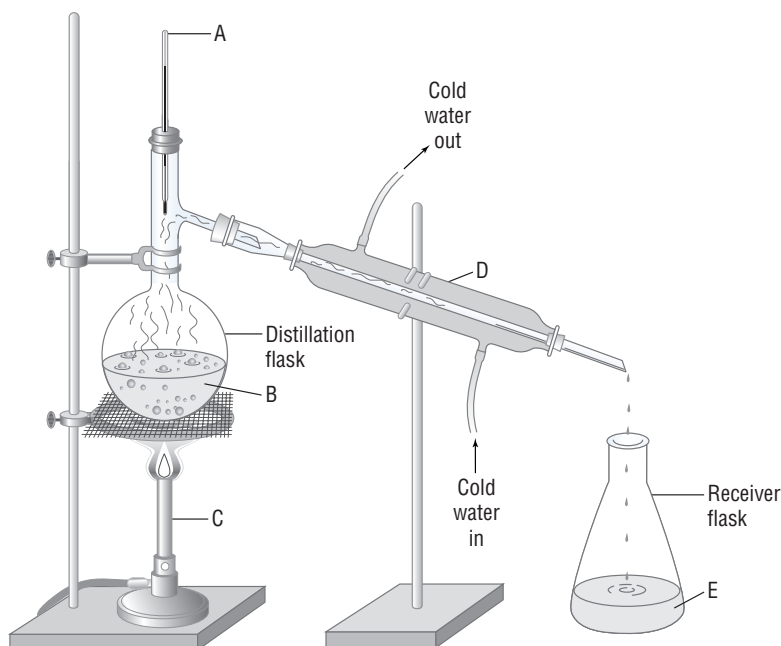
\_\_\_\_\_ 15. condenser

\_\_\_\_\_ 16. heat source

\_\_\_\_\_ 17. thermometer

\_\_\_\_\_ 18. tap water

\_\_\_\_\_ 19. distilled water





## Reading Skill Practice

By looking carefully at photographs and drawings in textbooks, you can better understand what you have read. Look carefully at Figure 2.8 on page 44. What important idea does this drawing communicate?

### SECTION 2.3 ELEMENTS AND COMPOUNDS (pages 48–52)

*This section explains a key difference between an element and a compound, and describes how chemical symbols and formulas are used to represent elements and compounds. It also summarizes the process for classifying substances and mixtures.*

#### ► Distinguishing Elements and Compounds (pages 48–49)

1. All living and nonliving things are made up of building blocks called \_\_\_\_\_.

2. What are the two groups into which substances can be classified?
- \_\_\_\_\_
- \_\_\_\_\_

3. Is the following sentence true or false? Elements can be easily separated into simpler substances. \_\_\_\_\_

4. Compounds are substances that can be separated into simpler substances only by \_\_\_\_\_ means.

5. Is the following sentence true or false? The properties of compounds are different from those of their component elements. \_\_\_\_\_

6. Complete this sentence.

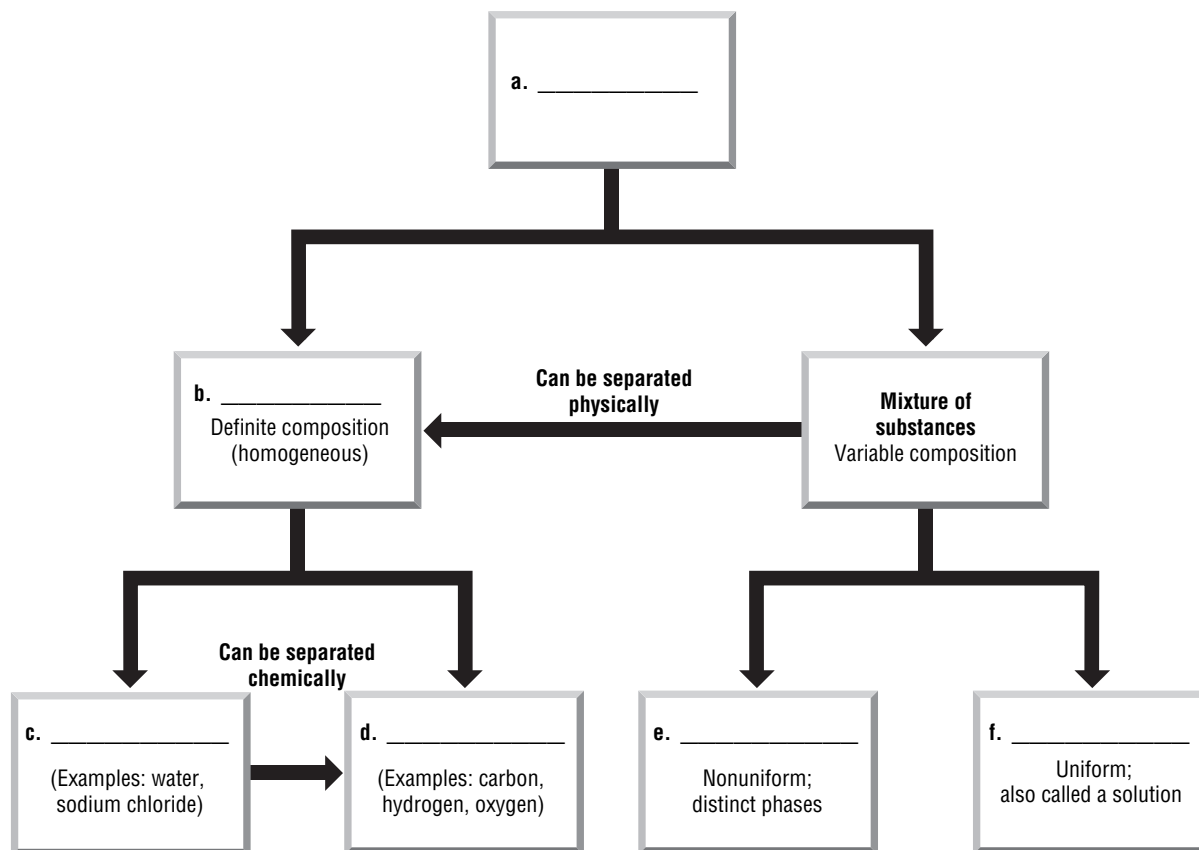
Sodium chloride (table salt) is a \_\_\_\_\_ of sodium, which is a soft \_\_\_\_\_, and chlorine, which is a pale yellow \_\_\_\_\_.

#### ► Distinguishing Substances and Mixtures (page 50)

7. Describe one way to decide whether a sample of matter is a substance or a mixture.
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

## CHAPTER 2, Matter and Change *(continued)*

8. Complete the labels in the diagram below.



### ► Symbols and Formulas (pages 51–52)

9. What is used to represent an element?

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10. What are chemical symbols used for?

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11. Subscripts in chemical formulas are used to indicate the relative proportions of the elements in the \_\_\_\_\_.

12. Is the following sentence true or false? The elements that make up a compound are always present in the same proportions. \_\_\_\_\_

13. Use Table 2.2 on page 52 to answer the following questions.

- a. Pb is the symbol for what element? \_\_\_\_\_
- b. What is the symbol for gold? \_\_\_\_\_
- c. Stibium is the Latin name for which element? \_\_\_\_\_

## SECTION 2.4 CHEMICAL REACTIONS (pages 53–55)

*This section provides clues to help you recognize a chemical change. It also teaches the law of conservation of mass.*

### ► Chemical Changes (page 53)

1. What is a chemical property?

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2. Is the following sentence true or false? Chemical properties are observed only when a substance undergoes a chemical change. \_\_\_\_\_

3. What happens during a chemical reaction?

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4. In chemical reactions, the substances present at the start of the reaction are called \_\_\_\_\_ and the substances produced are called \_\_\_\_\_.

5. Circle the letter of the term that best completes the sentence. A change in the composition of matter \_\_\_\_\_ occurs during a chemical reaction.

- a. sometimes
- b. rarely
- c. always
- d. never

6. Which representation of a chemical reaction is correct?

- a. products ☐ reactants
- b. reactants ☐ products

## CHAPTER 2, Matter and Change *(continued)*

### ► Recognizing Chemical Changes (page 54)

7. List the four possible clues to a chemical change?

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8. Is the following statement true or false? If you observe a clue for chemical change, you can be certain that a chemical change has taken place. \_\_\_\_\_

9. Define a precipitate.

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### ► Conservation of Mass (page 55)

10. During a chemical reaction, the mass of the products is always equal to the mass of the \_\_\_\_\_.
11. The law of conservation of mass states that in any physical change or chemical reaction, mass is neither \_\_\_\_\_ nor \_\_\_\_\_.
12. Look at Figure 2.15 on page 55. How do you know that mass was conserved?

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